SHAPE
DECOMPOSITION
MODULE
~14

SHAPE
RECOGNITION
MODULE
~16

~12

RULE APPLICATION
MODULE
~18

INTELLIGENT RULE
SELECTION
MODULE
~20

I/O INTERFACE
MODULE
~22

~10

Fig. 1

Fig. 2

Fig. 3

FIG. 4

RULE REMAINING IN SET? —30

—No→ TERMINATE OPERATION —32

Yes↓

SELECT RULE FROM PREDEFINED SET OF RULES TO BE APPLIED TO SET OF SHAPE C_0 —34

SET COUNTER i TO ONE; SET $S_0 = \emptyset$ —36

DECOMPOSE LEFT-HAND SHAPE OF RULE INTO N SUBSHAPE GROUPS $s_{i...N}$ —38

$s_i = \emptyset$? —40 —Yes→ SET $S_i = \emptyset$; SET C_i TO C_{i-1} —42 → i = N? —43

No↓

SEARCH SET OF SHAPES C_{i-1} FOR SUBSHAPE GROUP s_i ACCORDING TO TRANSFORMATIONS APPROPRIATE FOR SUBSHAPE GROUP —46

i = N? —43 No↓ INCREMENT COUNTER BY ONE —44

FIND SUBSHAPE GROUP s_i IN C_{i-1}? —48

—No→

Yes↓

GENERATE SET OF SHAPES S_i CORRESPONDING TO OCCURRENCES OF SUBSHAPES OF GROUP s_i FOUND IN C_{i-1} —50

SUBTRACT SHAPES S_i FROM C_{i-1} TO GENERATE SET OF SHAPES C_i —52

ADD SET S_i TO SUM OF SETS $S_{i-1,...,0}$ USING CONNECTIVITY TECHNIQUE —54

i = N? —56 —No→ DETERMINE RELATIVE CONNECTIVITY —58

Yes↓

SUM OF SET $S_{i...N}$ CORRESPOND TO TRANSFORMATIONS OF LEFT-HAND SHAPE OF SELECTED RULE FOUND IN SET OF SHAPES C_0 —59

Yes

Fig.5

62~

40

Fig.6

Fig.7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Fig. 12

a   b

Fig. 13

Co

s1

Fig. 14

s2

Fig. 15

S_1

Fig. 16

C_1
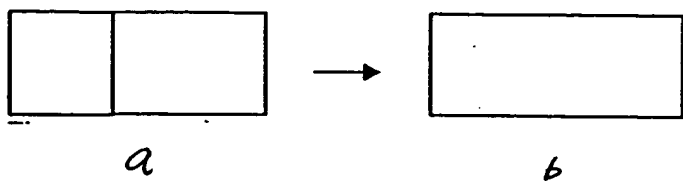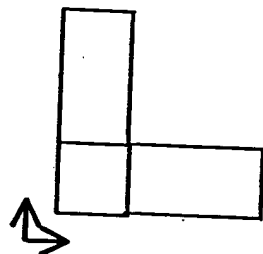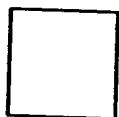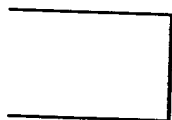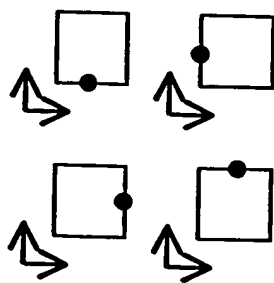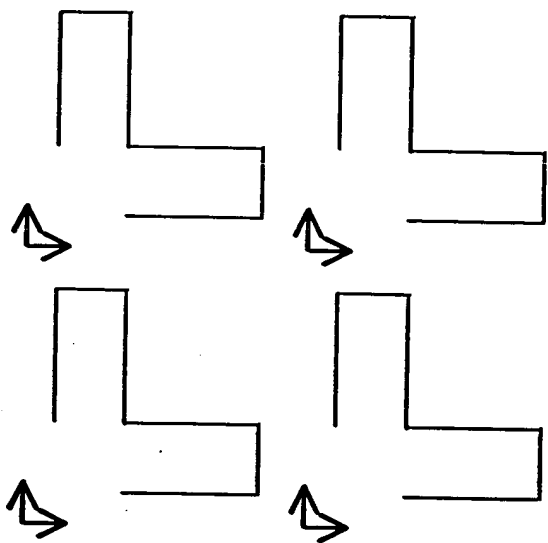
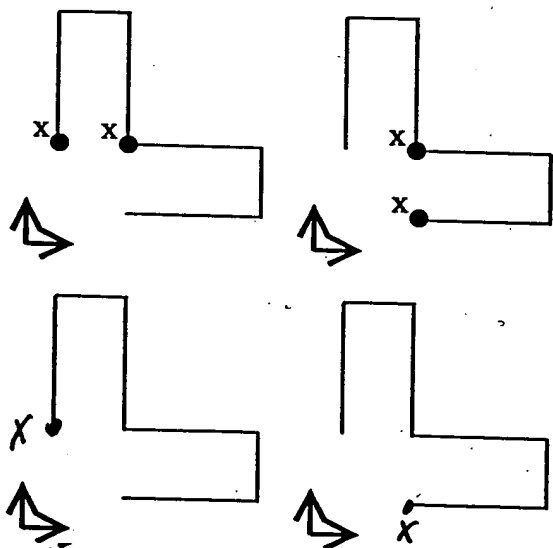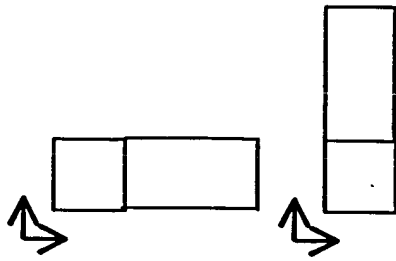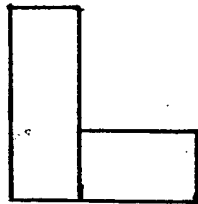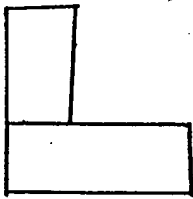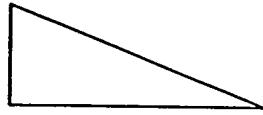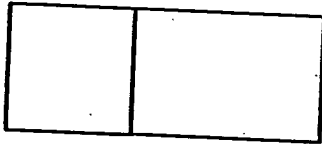Fig. 17

Fig. 18

$S_1 + S_2$

Fig. 19

Shape a → Shape b

Fig. 20

C_0

Fig. 21
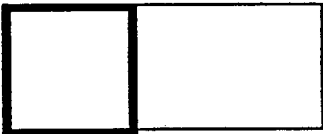
Fig. 22
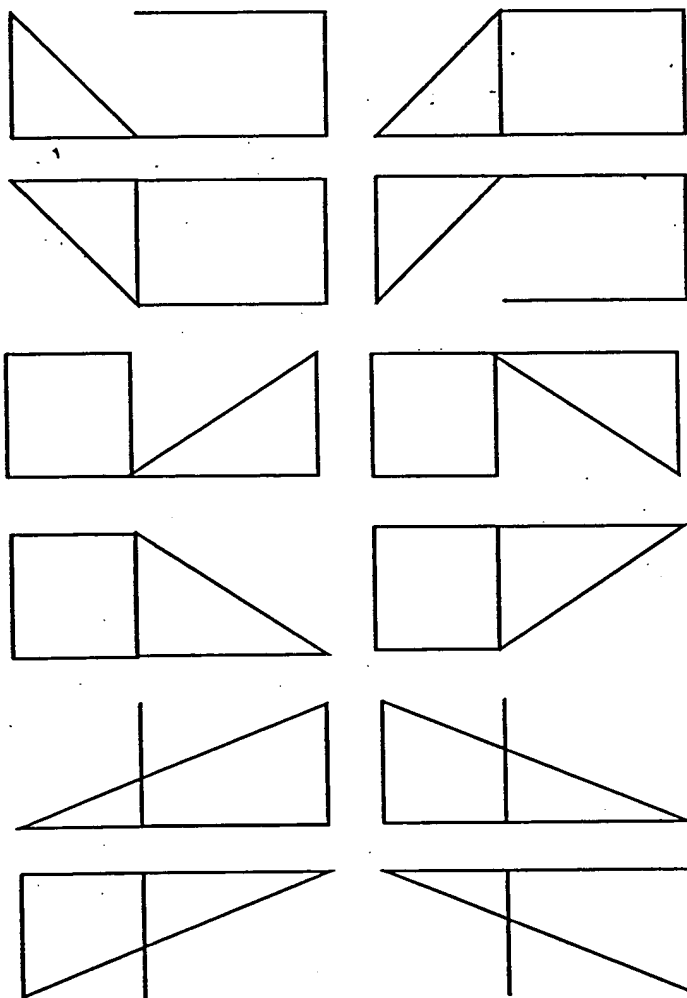
Fig. 23

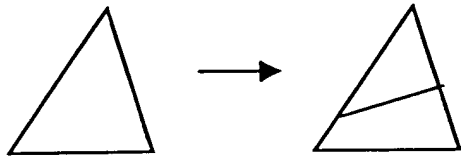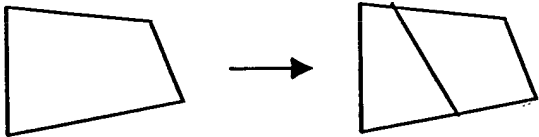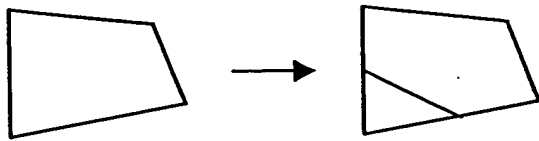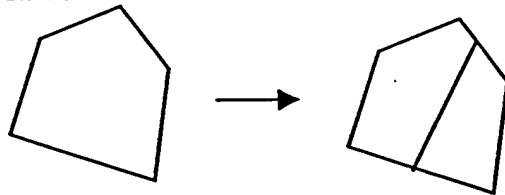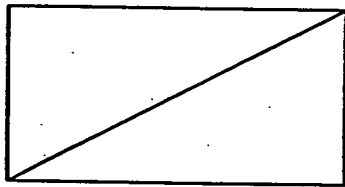Rule 1

Rule 2
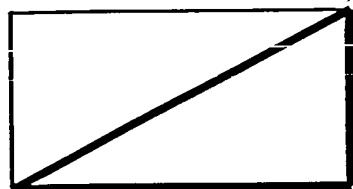
Rule 3

Rule 4

Fig. 24
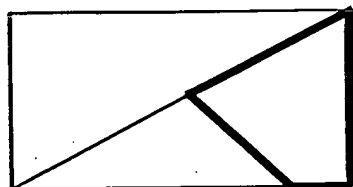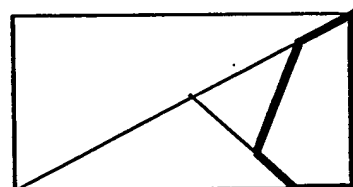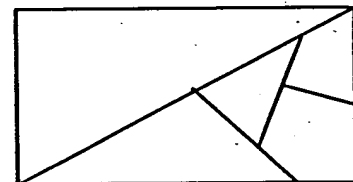
Fig. 25

(a) initial shape

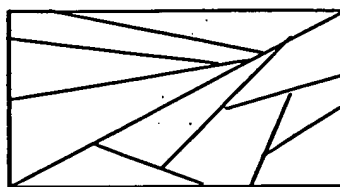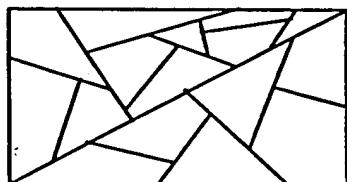(b) apply Rule 1

(c) apply Rule 3

(d) apply Rule 4

Fig. 26

Fig. 27